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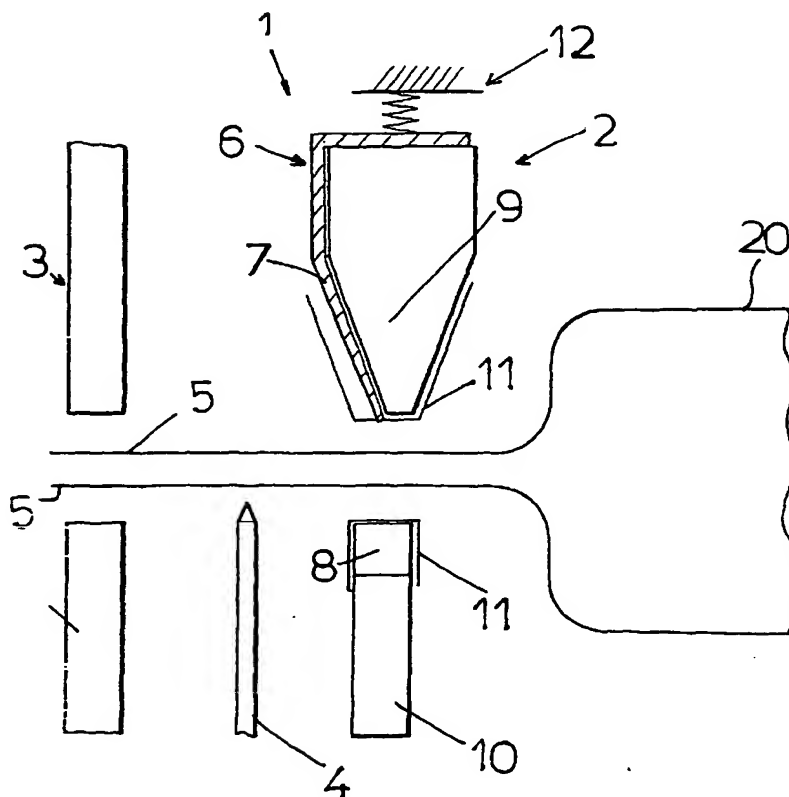
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[Continued on next page]

(54) Title: DEVICE AND PROCEDURE FOR WELDING AND CUTTING PLASTIC FILMS



(57) Abstract: The device and procedure for welding and cutting plastic film comprises welding means (9) and first holding means (3) between which means for cutting (4) said plastic film (5) is arranged. The device comprises second holding means (9) arranged on the opposite side to said first holding means (3) with respect to said cutting means (4), so as to hold said plastic film uniformly laid out during cutting. The procedure for welding and cutting plastic films laid on top of each other consists of locking said films between first (3) and second (7) holding means defining a portion of the films upon which to carry out the cutting, of welding said films in a position outside of said portion and of cutting said films at the previously defined portion.

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ning of each regular issue of the PCT Gazette.*

## DEVICE AND PROCEDURE FOR WELDING AND CUTTING PLASTIC FILMS

DESCRIPTION

The present invention refers to a device and procedure for welding and cutting plastic film.

In particular, hereafter reference shall be made to a device for welding two or more layers of plastic film, for example made from polyolefin, and to the subsequent cutting or realisation of perforated tearing lines.

Such devices are currently widely used to realise bags suitable for packaging baby diapers, adult diapers, ladies' pads and the like.

According to conventional embodiments such bags are made from unstretchable plastic.

In a first case devices of the conventional type foresee the welding and cutting of bags starting from a roll. In a second case bags are made starting from ready formed bags with just a single side open (in practice the upper side of the bag is already closed and can have a preformed handle, the base on the other hand is made through welding).

Conventional devices have a welding group, a holding group and, between them, a cutting group.

Therefore, by using conventional devices the roll (or the preformed bags) are held at an end by the holding group and, whilst they are welded, are cut by the cutting group.

Nevertheless, in recent times deformable and/or elastic plastic materials have been increasingly used due to the thicknesses of the films which are increasingly thinner and

the mixtures used which must make the packaging materials more cost-effective, more aesthetically pleasing and/or more environmentally-friendly.

The conventional device, although it is capable of ensuring satisfactory results using unstretchable plastic films, has proved itself totally unsuitable for welding and cutting bags made using deformable and/or elastic plastic material which, in particular, can be stretched when subjected to strains in its plane as takes place in devices of the type indicated.

In this case, indeed, it has been noted that the cutting following welding causes a damaging of the welding with numerous irregularities and imperfections in the cut profile. In more serious cases it has also been noted that the welded portions reopen.

All of this, of course, is the cause of high production waste and, therefore, costs which it would be suitable to cut.

The technical task proposed of the present invention is, therefore, that of realising a device and procedure for welding and cutting plastic film which allow the aforementioned technical drawbacks of the prior art to be eliminated.

In this technical task, a purpose of the invention is that of realising a device and procedure which allow films to be cut and welded so as to realise bags also using films made from deformable and/or elastic plastic which, in particular,

can stretch when subjected to stress in its plane.

Another purpose of the invention is that of realising a device and procedure which do not cause the damaging of the weldings and the irregularities or imperfections in the cut profile. In particular, the device and procedure according to the present finding do not cause the reopening of the portions of the bag which are already welded.

The last but not least purpose of the invention is that of realising a device and procedure which cause a lower number of production wastes and, therefore extremely reduced production costs.

The technical task, as well as these and other purposes, according to the present invention are achieved by realising a device for welding and cutting plastic films comprising welding means and first holding means between which means for cutting said plastic film is arranged, characterised in that it comprises second holding means arranged on the opposite side to said first holding means with respect to said cutting means, so as to hold said plastic film uniformly laid out during cutting.

The present finding also refers to a procedure for welding and cutting plastic films laid on top of each other, characterised in that it consists of locking said films between first and second holding means defining a portion of the films upon which to carry out the cutting, of welding said films in a position outside of said portion and of cutting said films at the previously defined portion.

Further characteristics of the present invention are, moreover, defined in the other claims.

Further characteristics and advantages of the invention shall become clearer from the description of a preferred but not exclusive embodiment of the device and procedure for welding and cutting plastic films according to the finding, where the device is illustrated for indicating and not limiting purposes in the attached drawings, in which:

- figure 1 shows a schematic view of the device according to the present finding;
- figure 2 shows a schematic view of the device of figure 1 during the welding and cutting of the films of the bag; and
- figure 3 shows a schematic perspective view of a bag realised through the device of figure 1.

With reference to the quoted figures, a device for welding and cutting plastic films is shown, wholly indicated with reference numeral 1.

The device 1 comprises welding means 2 and first holding means 3 (equipped with a pneumatic sucking device for the waste determined by the cutting not shown for the sake of simplicity) between which means 4 for cutting the plastic films 5 which make up the bag 20 to be closed is arranged.

The cutting means 4 comprises a serrated knife with different shapes and sizes of the serrations according to the type of film used.

The device 1 also comprises second holding means 6

arranged on the opposite side to the first holding means 3 with respect to the cutting means 4, so as to hold the plastic films uniformly laid out during cutting.

The second holding means 6 is arranged adjacent and parallel to the welding means 2 between the cutting means 4 and the welding means 2 and comprise a presser 7 operatively connected to an abutment element 8.

Preferably, the presser 7 is connected to a welding bar 9 of the welding means and the abutment element 8 is connected (for example superposed) to a counter welding element 10 of the welding means.

The welding bar 9 preferably is of the electrical type and has a trapezoidal cross section with a base size to fit the required welding width.

The counter welding element 10 acts as an abutment and preferably consists of a flat base made from deformable material covered by an anti-stick layer.

Preferably, during use the counter weld 10 is heated to allow the welding of the film and to not be influenced by the variability of the thickness of the films 5.

Advantageously, the presser 7 comprises a bar made from a heat conducting material such as metal and preferably copper or aluminium alloys and the abutment element 8 comprises an anti-stick rubber material resistant to heat (for example silicon rubber and PTFE fabric).

Preferably, moreover, the presser 7 and/or the abutment element 8 have a coating element 11 made from anti-stick

material.

Suitably, the presser 7 has means 12 for regulating the stress applied on the plastic films which comprise one or more elastic compression springs made from harmonic steel.

Advantageously, the presser 7 in combination with the abutment element 8, is suitable for realising an additional welding cord on the plastic films.

The operation of the device for welding and cutting plastic films according to the invention appears clear from that which has been described and illustrated and, in particular, is substantially the following.

The films are held between the first holding means 3 and the second holding means 6 uniformly laid out and not deformed or stretched.

The knife 4 applies its cutting action in a regular manner and, thanks to the second holding means 6, without applying stresses on the welded portion avoiding the risk of reopening of the welding not yet cooled and of lacerations or deformations of the welded area.

Advantageously, the particular geometry of the serrations does not prejudice the quality of the cut, since the films are held in laid out position under tension.

Suitably, moreover, even temperature variations of the welding bar 9 and of the counter welding 10 generated by the process and variations in thickness of the films 5 can negatively influence the process.

Advantageously, moreover, the bag 20, when it is



realised, besides the welding 21 (which is also realised with conventional machines), has the additional welding 22 realised by the second holding means 6 to the great advantage of the quality and secureness of the closing of the bag 20.

The regulation means 12 allow the automatic registration of the pressure on the films 5 according to the characteristics of the material of the films themselves and the stress that the material itself is undergoing by effect of the combination of the welding action and the locking applied by the first and second holding means 3, 6.

The present invention also refers to a procedure for welding and cutting plastic films 5 laid on top of each other.

The procedure according to the present finding consists of locking the films 5 between the first and second holding means defining a portion of the films 5 upon which to carry out the cutting, of welding the films in a position outside of this portion and of cutting the films 5 at the previously defined portion.

Advantageously, the films 5 are welded realising two adjacent and substantially parallel welding cords.

The films 5 are, suitably, made from deformable or elastic plastic.

In practice, it has been noted how the device and procedure for welding and cutting plastic film according to the invention are particularly advantageous because they allow high quality bags to be realised at substantially

reduced costs.

The device and procedure for welding and cutting plastic film thus conceived are susceptible to numerous modifications and variants, all covered by the inventive concept. Moreover, all of the details can be replaced by technically equivalent elements.

In practice, the materials used, as well as the sizes, can be whatever according to the requirements and the state of the art.

CLAIMS

1. Device and procedure for welding and cutting plastic film comprising welding means and first holding means between which means for cutting said plastic film is arranged, characterised in that it comprises second holding means arranged on the opposite side to said first holding means with respect to said cutting means, so as to hold said plastic film uniformly laid out during cutting.

2. Device according to claim 1, characterised in that said second holding means is arranged adjacent and parallel to said welding means between said cutting means and said welding means.

3. Device according to one or more of the previous claims, characterised in that said second holding means comprises a presser operatively connected to an abutment element.

4. Device according to one or more of the previous claims, characterised in that said presser is connected to a welding bar of said welding means and said abutment element is connected to a counter welding element of said welding means.

5. Device according to one or more of the previous claims, characterised in that said presser comprises a metal bar and said abutment element comprises an anti-stick rubber material resistant to heat.

6. Device according to one or more of the previous claims, characterised in that said presser and/or said

abutment element have a coating element made from anti-stick material.

7. Device according to one or more of the previous claims, characterised in that said presser has means for regulating the stress applied on the plastic films.

8. Device according to one or more of the previous claims, characterised in that said regulation means comprises one or more elastic compression springs.

9. Device according to one or more of the previous claims, characterised in that said presser in combination with said abutment element, is suitable for realising an additional welding cord on said plastic films.

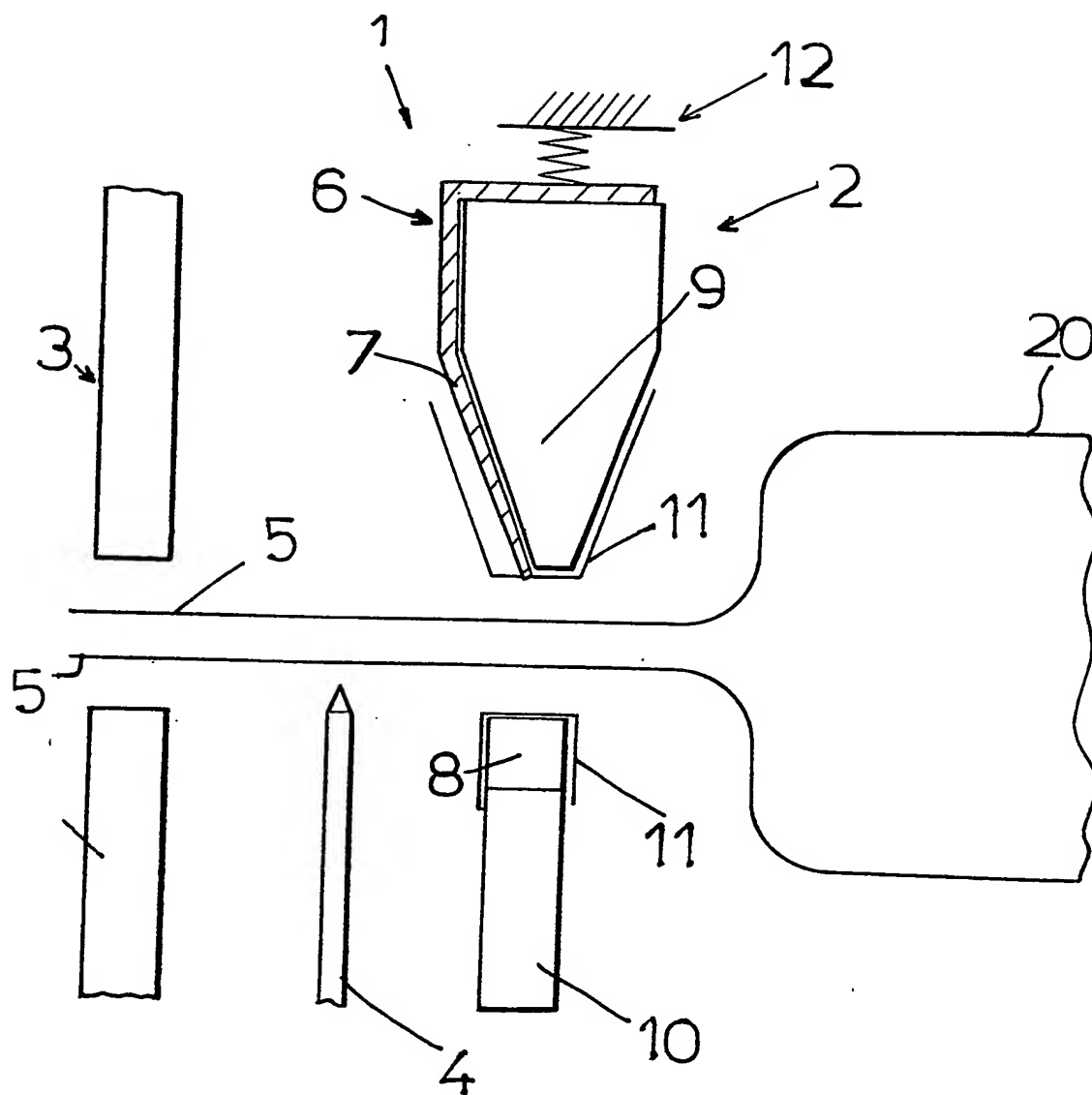
10. Procedure for welding and cutting plastic films laid on top of each other, characterised in that it consists of locking said films between first and second holding means defining a portion of the films upon which to carry out the cutting, of welding said films in a position outside of said portion and of cutting said films at the previously defined portion.

11. Procedure according to the previous claim, characterised in that said films are welded realising two adjacent and substantially parallel welding cords.

12. Device and/or procedure according to one or more of the previous claims, characterised in that said films are made from deformable or elastic plastic.

13. Device and procedure for welding and cutting plastic film, all as substantially described, illustrated in the

attached tables of drawings and claimed.



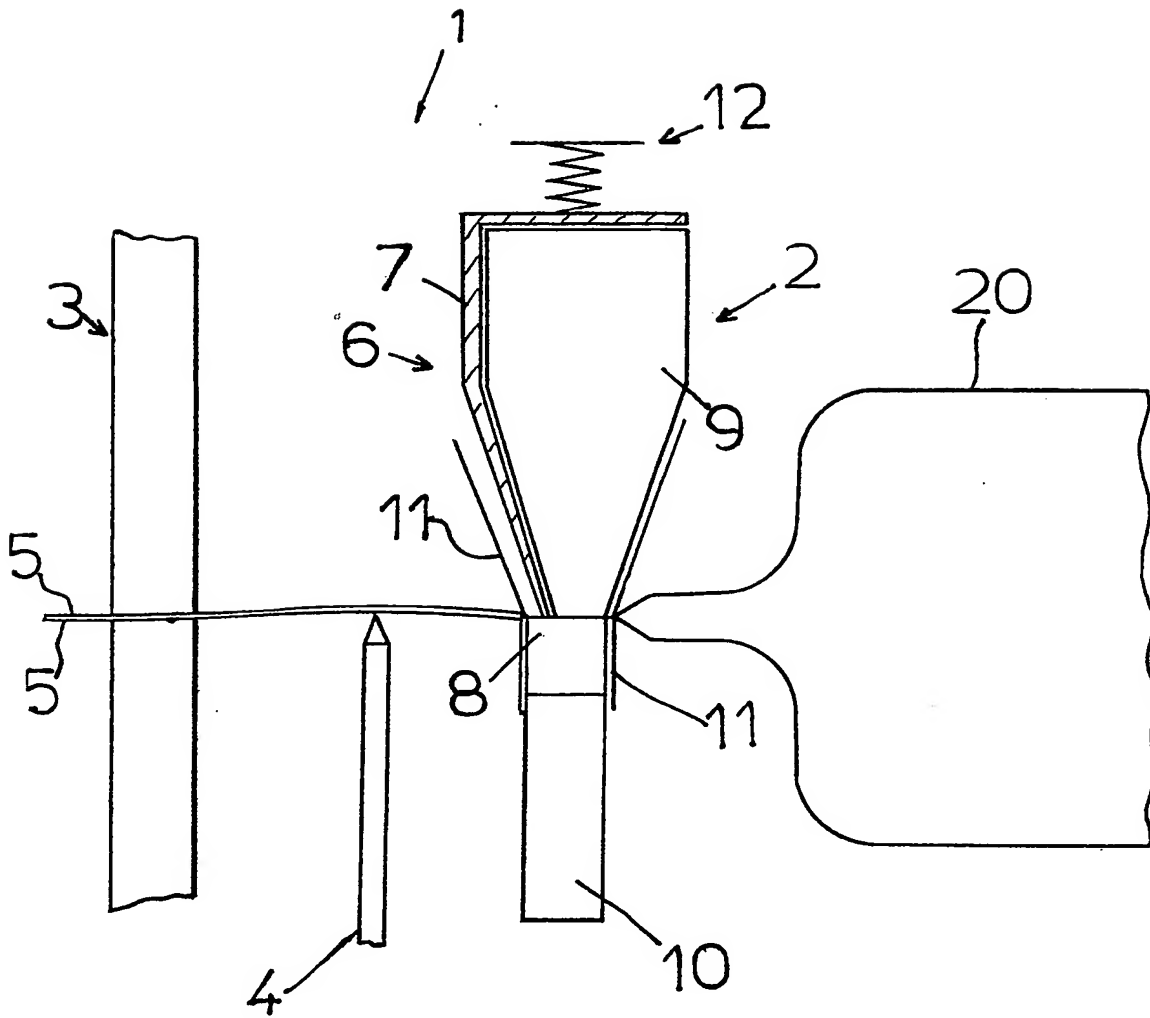
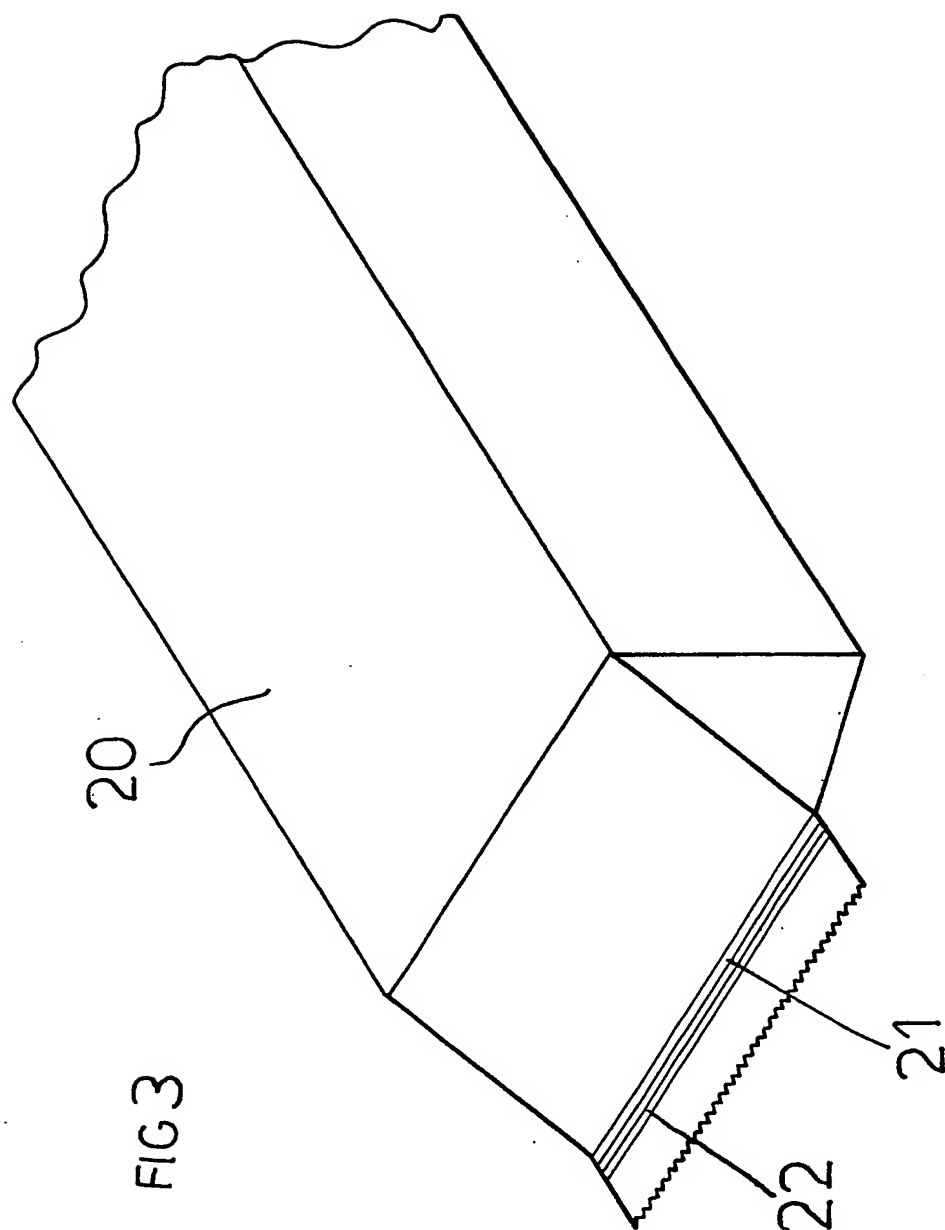


FIG 2





# INTERNATIONAL SEARCH REPORT

International Application No.

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## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B29C65/74 B26D7/14 //B65B51/14, B65B61/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B29C B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	PATENT ABSTRACTS OF JAPAN vol. 1996, no. 09, 30 September 1996 (1996-09-30) -& JP 08 119218 A (MATSUDA SEIJI), 14 May 1996 (1996-05-14) abstract	1
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- \*Z\* document member of the same patent family

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## INTERNATIONAL SEARCH REPORT

International Application No

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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